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Varian 705 DS Dissolution Apparatus Operator's Manual

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Revision B

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Chapter 1 Safety Practices and Hazards

The Varian 705 DS Dissolution Apparatus has been carefully designed so that when used properly you have an accurate, fast, flexible, and safe instrument.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Operation of a Varian 705 DS Dissolution Apparatus involves the use of aqueous liquids and various pharmaceutical dosage forms. Unskilled, improper, or careless use of this instrument can create shock hazards, fire hazards, or other hazards which can cause death, serious injury to personnel, or severe damage to equipment and property.

Information on safety practices is provided with your instrument and operation manuals. Before using your instrument or accessories, you must thoroughly read these safety practices.

Observe all relevant safety practices at all times.

Electrical Hazards

The dissolution apparatus contains electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers. Consult the manuals or product labels supplied with the dissolution apparatus to determine which parts are operator-accessible.

Application of the wrong supply voltage, connection of the instrument to an incorrectly wired supply outlet, or lack of proper electrical grounding can create a fire hazard or a potentially serious shock hazard, and could seriously damage the instrument and any attached ancillary equipment.

Always use a three-wire outlet with ground connection which is adequately rated for the load. The installation must comply with local, state, and federal safety regulations.

Do not connect the instrument to the main power supply until you have made sure that the operating voltage is correctly set for the main power supply in the specific outlet in your laboratory to which the equipment will be connected.

Other

Other specific warnings and cautions appear in the manuals where appropriate and detail the specific hazard, describe how to avoid it, and specify the possible consequences of not heeding the warning or caution.

Warning

A 'Warning' message appears in the manual when failure to observe instructions or precautions could result in death or injury. Symbols depicting the nature of the specific hazard are also placed alongside warnings.

These symbols are also used on warning labels attached to the instrument. When you see one of these symbols, you must refer to the relevant operation or service manual for the correct procedure referred to by that warning label.

The meaning of the symbols that appear alongside warnings in this manual are as follows:

Electrical shock

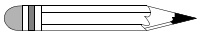
Caution
Refer to accompanying documents

Read all warnings and cautions carefully and observe them at all times.

Caution

A 'Caution' message appears in the manual when failure to observe instructions could result in damage to equipment (Varian supplied and / or other associated equipment).

A 'Note' appears in the manual to give advice or information.



Information Symbols

I	Switches main power on
0	Switches main power off
	Indicates single-phase alternating current
	Indicates the product complies with the requirements of one or more European Union (EU) directives
	Indicates specific equipment meets consensus-based standards of safety to provide assurance, required by OSHA, that these products are safe for use in the workplace for North America
	Indicates that this product must not be disposed of as unsorted municipal waste (see "WEEE Directive" on page 11)

General

CE Compliant Products

The Varian 705 DS Dissolution Apparatus has been designed to comply with the requirements of the Electro-magnetic Compatibility (EMC) Directive and the Low Voltage Directive (LVD) of the EU.

Varian, Inc. has confirmed that each product complies with the relevant directives by testing a prototype against the prescribed European Norm (EN) standards.

Proof that a product complies with the directives is indicated by:

- the CE marking appearing on the rear of the product.
- the documentation package that accompanies the product containing a copy of the declaration of conformity. This declaration is the legal declaration by Varian, Inc. that the product complies with the directives and also shows the EN standards to which the product was tested to demonstrate compliance. The declaration of conformity is signed by the representative of the manufacturing plant.

cTUVus - U.S. and Canadian Product Approvals

The Varian 705 DS Dissolution Apparatus has been designed to comply with North American safety requirements.

This product has been tested and certified for the North American market by TUV Rheinland of North America, Inc. The TUVus mark signifies that this product has been tested to U.S. standards and certified for the U.S. market. The cTUV mark signifies that this product has been tested to Canadian standards and certified for the Canadian market. When the two marks are coupled, the cTUVus mark signifies that this product has been tested to standards and certified for both markets.

WEEE Directive

All Varian products that are subject to the WEEE directive shipped after August 13, 2005 are compliant with the WEEE marking requirements. Such products are marked with the "crossed out wheelie bin" WEEE symbol shown on page 10 in accordance with European Standard EN 50419.

This symbol on the product or on its packaging indicates that this product must not be disposed of as unsorted municipal waste. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

For more information on collection, reuse, and recycling systems, please contact your local/regional waste administration, your local distributor, or Varian, Inc.

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Chapter 2 Introduction

The Varian 705 DS Dissolution Apparatus is designed for dissolution testing of a variety of pharmaceutical compounds, including tablets, capsules, transdermal patches, and membranes. It can be configured as USP Apparatus 1, 2, 5, or 6.

The unit has eight vessel locations and ships standard as a six-spindle apparatus. As an eight-spindle apparatus, it can accommodate six samples, a standard, and a blank. Optionally, the seventh and eighth vessel positions can be used for “at-temperature” media replacement.

The Varian 705 DS Dissolution Apparatus delivers many features designed to simplify operation including microprocessor control, easy-to-read displays, and innovations to guarantee system alignment.

The unit’s microprocessor control allows touchscreen entry of operating parameters including temperature, RPM, and elapsed time. The LCD provides real-time monitoring of RPM, water bath or vessel temperature measurement, and the elapsed time since test initiation.

The manual lift mechanism is easy to use due to the smooth functioning of the dissolution apparatus. The instrument glides into place and a single turn locks or unlocks the drive unit. A pressurized piston equilibrates the weight of the drive unit for easy positioning.

The working height with the drive unit lowered is approximately 9 inches (23 cm) between the vessel plate and the drive unit, which allows ample room for easy manual sampling. Automated analysis can be accomplished via resident sampling cannulas mounted in the evaporation covers.

The alignment features on the Varian 705 DS Dissolution Apparatus include locking collars which are easy to slide on and secure into place. These collars hold the shaft securely while in operation, yet allow the shaft to be raised and lowered to precisely the correct height for easy staggered starts using either paddles or baskets. Additionally, the precision-engineered self-aligning EaseAlign centering rings eliminate time-consuming manual adjustments by automatically centering vessels based on the interior wall.

The included independent heater / circulator is designed for use with the Varian 705 DS Dissolution Apparatus. Isolated from the apparatus, the chance of vibrational influences from the heater / circulator are eliminated. Due to its compact size the heater / circulator can be housed beneath the base plate conserving valuable bench space.

A PETG polymer water bath allows for uniform temperature control of all vessels. The water bath is clear and seamless offering an unobstructed view of the vessels. The water bath is a single-piece unit with a built-in drain hose for easy cleaning.

An optional stand-alone dot matrix printer can be used for documentation purposes, providing hard copies of your test parameters including elapsed time, RPM, and temperature.

The Varian 705 DS Dissolution Apparatus meets all USP, EP, JP, and FIP guidelines and is shipped with a calibration certificate for the physical parameters specific to each instrument.

The Varian 705 DS Dissolution Apparatus has a chemical-resistant design that includes type 316 stainless steel support legs and acid-resistant base plate.

Warning

The dissolution apparatus contains electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

FIGURE 1. Varian 705 DS Dissolution Apparatus

Caution

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers.

Conventions Used in this Manual

- Screen options you are asked to press are in bold. For example, "press **Esc**".
- Sequences you are asked to press appear like this: **Menu** > **RPM**.

Note

Remember to return the warranty card supplied with this manual. Completing and returning the card ensures your right to protection under the terms and conditions of your warranty. It also enables us to better assist you in the event of any problems. Additionally, it guarantees you will be informed of any issues that arise concerning your equipment, such as upgrades, retrofits, or regulatory changes.

USP Suitability Test

Before initial use of any dissolution instrument, and periodically thereafter, the USP requires that you run an Apparatus Suitability Test with both disintegrating and non-disintegrating USP Dissolution Calibrators. These calibrator tablets are available from the USP at the following address:

USP-NF Reference Standards
12601 Twinbrook Parkway
Rockville, MD 20852
301.881.0666

Complete instructions come with the calibrator tablets. Calibration tests can be very sensitive to factors such as paddle or vessel misalignment, vessel shape, vibration of the system, age of the calibrator tablets and reference standards, and many other factors.

USP Physical Parameters

In addition to the Apparatus Suitability Test, several physical parameters must be monitored, such as shaft wobble, centering, speed, and shaft verticality. A Certificate of Compliance is included with all dissolution apparatus. Contact the Dissolution Systems Service Department for more information on USP Physical Parameters.

Chapter 3 Setting Up

Unpacking Your Equipment

The Varian 705 DS Dissolution Apparatus is shipped in one box. The box contains the dissolution apparatus, including the glassware, PETG water bath, accessories, and heater / circulator.

Step 1. Open the carton and check the contents for damage which may have occurred during shipping. Shipping damage rarely occurs, but if it does contact both the carrier who delivered the instruments and the Dissolution Systems Service Department. Though claims for damage should be filed with the carrier, we can help you file a claim.

Step 2. Carefully remove the apparatus, water bath, accessory kit, and heater / circulator from their shipping carton.

Warning

Because of its heavy weight, two people should lift the apparatus. Do not lift the apparatus by the drive unit. Lift by holding the legs or vessel plate.

Step 3. Remove cushioning material and tape. If any item is missing, contact the Dissolution Systems Service Department or your local representative for replacements.

Step 4. Place the apparatus and heater / circulator on a clean, dry, and level section of the bench.

Warning

The electrical connection at the back of the apparatus is the primary disconnect for the instrument. The apparatus should be positioned to allow accessibility to the power cords for easy disconnection.

Leveling Your Dissolution Apparatus

Step 1. Place the level provided in the accessory kit on the vessel table.

Step 2. Check the level of the instrument in the front and rear center of the unit as well as the left and right sides.

Step 3. The bottoms of the legs have adjustable rubber feet. These may be screwed in or out to raise or lower each leg. Adjust the feet so the bubble inside the level is within the circle at all four points.

Electrical Connections

Warning

Ensure the apparatus is configured for the voltage available in your laboratory. Check the serial number tag on the rear panel of the instrument to confirm the voltage requirement.
The electrical connection at the back of the apparatus is the primary disconnect for the instrument.

Step 1. Verify the Varian 705 DS Dissolution Apparatus is off.

Step 2. Connect the power cord between the receptacle on the drive unit rear panel and an outlet of the appropriate voltage.

Step 3. Connect the power cord between the receptacle on the heater / circulator and an outlet of the appropriate voltage.

Connecting the Heater / Circulator

Caution

Connect the heater / circulator to the water bath and ensure the drain valve is in the closed position. Fill the water bath before turning on the heater / circulator to avoid damaging the heating elements.

Step 1. Place the heater / circulator under the rear of the vessel plate with the power switch to the right of the unit and the power outlet to the rear. The two front feet of the heater / circulator should be placed into the two large holes in the apparatus's bottom center brace. To reduce possible influence of vibration, ensure the heater / circulator is not touching the apparatus.

Step 2. Locate the two pieces of plastic tubing and the four tubing clamps included in the heater / circulator kit.

Step 3. Place one end of the plastic tubing over the barbed 90 degree angle adapter located to the right of the water bath. This is the water bath inlet.

Step 4. Slide one of the tubing clamps over the free end of the tubing and slide it over the barbed angle adapter. Secure the tubing clamp.

Caution

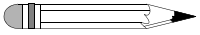
Do not over-tighten the tubing clamps. Damage to the plastic tubing could result.

Step 5. Slide another clamp over the free end of the tubing and attach the free end to the supply inlet located on the right side of the heater / circulator. Secure the tubing clamp.

Step 6. Place one end of the other piece of plastic tubing over the barbed 90 degree angle adapter located to the left of the water bath. This is the water bath outlet.

Step 7. Slide one of the stainless steel clamps over the free end of the tubing and over the barbed angle adapter. Secure the tubing clamp.

Step 8. Slide the last clamp over the free end of the tubing and attach the free end to the return inlet located on the left side of the heater / circulator. Secure the tubing clamp. Do not over-tighten as damage may occur. Recheck all connections.



Note

You can cut the tubing to any length required if the precut pieces are too long.

Step 9. Connect the six-pin cable to the rear of the heater / circulator and the other end into the position marked BATH HEATER on the dissolution apparatus rear panel.

Step 10. Locate the water bath temperature probe. Install the temperature probe into the vessel plate using the grommet provided. Plug the probe's cable in the position marked BATH TEMP on the dissolution apparatus rear panel.

Step 11. Plug the vessel temperature probe cable into the position marked VESSEL PROBES.

Step 12. Fill the water bath with water to approximately 3/4 full and check for leaks. Recheck the level of the instrument.

Installing and Centering the Vessels

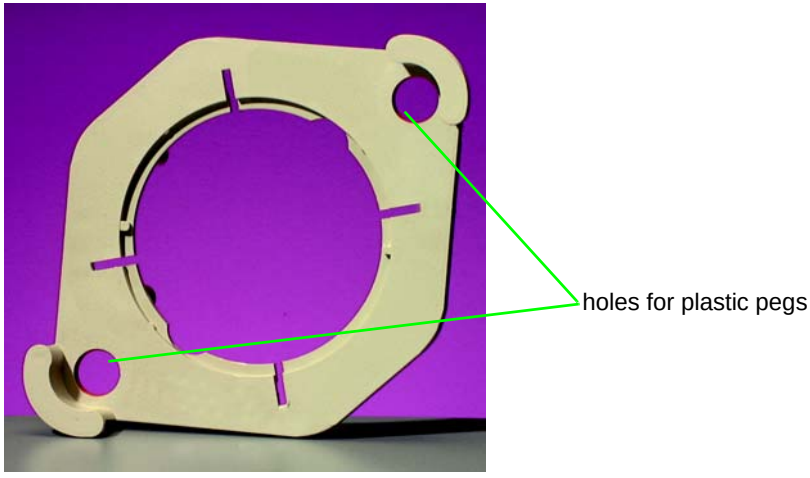
The apparatus is supplied with self-centering EaseAlign centering rings. EaseAlign centering rings keep the vessel centered at all times, without the use of tools, and prevent vessels from "floating" even when they are empty.

Step 1. The EaseAlign centering rings are normally shipped in place on the vessel plate. Remove the rings from the vessel plate.

Step 2. Place each of the vessels on the vessel plate. The EaseAlign centering rings have two large holes to accommodate the plastic pegs adjacent to each vessel location on the vessel plate. Press one EaseAlign centering ring firmly into each vessel with the alignment fingers inside the vessel. See Figure 2, "EaseAlign centering ring," on page 22.

Step 3. When pushed down securely, the vessels are automatically aligned and require no further adjustment.

FIGURE 2. EaseAlign centering ring



Installing Receptor Shafts

To install the receptor shafts, complete the following steps:

Step 1. Raise the drive unit to its maximum height.

Step 2. Insert a shaft into each spindle until at least half of the shaft is above the top of the spindle.

Step 3. Place a shaft locking ring on the top of each shaft and slide it down until it rests on the shaft collar.

Step 4. Tighten the set screws using the 7/64-inch T-handle Allen wrench provided. Leave the drive unit in the fully raised position.

Setting Paddle Height

Step 1. Attach a paddle shaft to each receptor shaft.

Step 2. Place a 25 mm height sphere in each of the vessels.

Step 3. Lower the drive unit until it stops.

Step 4. Loosen each set screw and carefully lower each paddle assembly until the bottom of the paddle blade rests against the height sphere.

Step 5. Tighten each set screw securely.

Step 6. Rotate each shaft locking ring so the drive positioning teeth on both the shaft locking ring and the shaft collar rest against one another, locking the shaft in place.

Step 7. Raise the drive unit to its home position.

Step 8. Remove the height spheres from the vessels.

Step 9. Lower the drive unit until it stops. The paddles are set to their USP-specified height of 25 ± 2 mm above the bottom of the vessel.

Setting Basket Height

Step 1. Attach a basket shaft to each receptor shaft.

Step 2. Clip the basket height gauge onto the first shaft.

Step 3. Lower the drive unit until it stops.

Step 4. Loosen the set screw and carefully lower the basket shaft assembly until the bottom of the gauge rests against the bottom of the vessel. Be careful not to use excessive pressure or the bottom of the vessel may crack.

Step 5. Tighten the set screw securely.

Step 6. Rotate the shaft locking ring so the drive positioning teeth on both the shaft locking ring and the shaft collar rest against one another, locking the shaft in place.

Step 7. Raise the drive unit to its home position.

Step 8. Remove the height gauge from the basket shaft.

Step 9. Attach a basket being careful not to bend or distort the basket.

Step 10. Repeat steps 2 - 9 for each of the remaining positions.

Step 11. Lower the drive unit until it stops. The baskets are set to their USP-specified height of 25 ± 2 mm above the bottom of the vessel.

Removing Paddles or Baskets Shafts

To remove the paddles or basket shafts, complete the following steps:

Step 1. Loosen the 1/8-inch Allen screw on the shaft collar and remove the collar. Repeat this procedure with all positions.

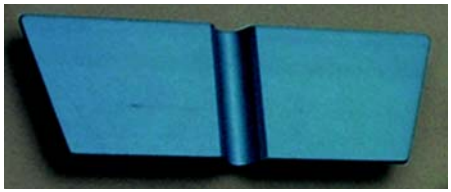
Step 2. Raise the drive unit to the upmost position and gently remove the basket shafts taking care not to drop them into the vessels.

Centering Verification

To verify the centering of the EaseAlign vessels, complete the following steps:

Step 1. Locate the blue EaseAlign Centering Verification Gauge.

FIGURE 3. EaseAlign Centering Verification Gauge



Step 2. Lower the drive unit until the top of the paddle blade or basket is approximately 2 inches (5 cm) below the rim of the vessel.

Step 3. Place the gauge against the shaft with the shaft resting in the radial cutout.

Step 4. Slide the gauge down the shaft until the tapered ends pass through the slots in the EaseAlign centering ring. See Figure 2, "EaseAlign centering ring," on page 22. The tapered sides of the gauge rest against the inside rim of the vessel. The gauge is level in this position indicating the vessel is centered.

Step 5. Lift the gauge and rotate it 90 degrees.

Step 6. Repeat steps 3 - 5 fitting the gauge in the remaining two slots on the EaseAlign centering ring.

Printer Setup

The printer can be placed in any convenient location near the Varian 705 DS Dissolution Apparatus. Follow these steps to connect the printer:

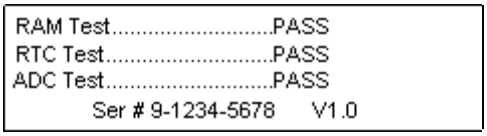
Step 1. Connect one end of the parallel printer cable to the printer, and the other end into the position marked PRINTER on the rear of the Varian 705 DS Dissolution Apparatus.

Step 2. Plug the power supply into a properly grounded power outlet and the cord into the power connection in the rear of the printer.

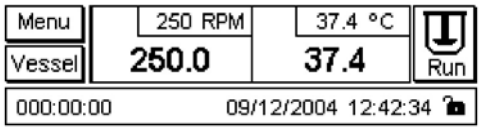
FIGURE 4. Printer

Powering Up the Varian 705 DS Dissolution Apparatus

Turn on the dissolution apparatus. A Power-up Self Test (POST) routine executes. The pass / fail result for each test displays in order to verify correct functioning of the instrument. The system serial number and the firmware version display at the bottom of the main screen. After successful completion of the POST, the following screen displays.



After three seconds, the main screen displays.



Note

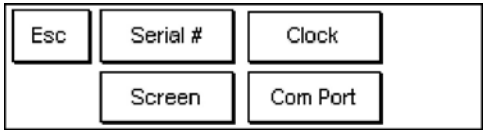
If the POST fails, an alarm sounds and FAIL displays next to the appropriate test. Press OK to acknowledge the fault condition, silence the alarm, and continue to the main screen.

Preliminary Functions

Prior to using the Varian 705 DS Dissolution Apparatus, it may be necessary to set the clock or communication port identification number, adjust the brightness or contrast of the LED screen, or calibrate the touchscreen. These functions are available from the second system menu screen.

From the status screen, press **Menu**. The system menu screen displays:

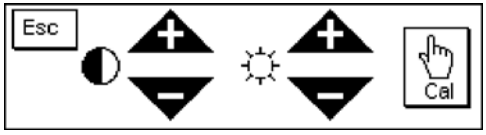
Press **More**. The following screen displays:



Once complete, press **Esc** twice from any of the secondary screens listed below to return to the status screen.

Setting the Screen Contrast and Brightness

Step 1. Press **Screen**. The following screen displays:



Step 2. Use the plus and minus arrows on the left side to adjust the screen contrast.

Step 3. Use the plus and minus arrows on the right side to adjust the screen brightness.

Calibrating the Touchscreen

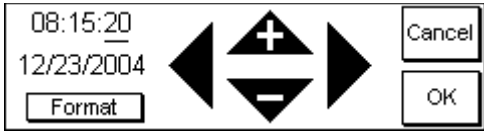
To recalibrate the touchscreen, press **Cal**. The Screen Settings screen displays. Follow the onscreen instructions.

Note

If the screen calibration is inaccurate or off balance so that the touchscreen does not respond, turn off the apparatus and tap the POST screen prior to the completion of the test. The Screen Settings screen displays. Follow the onscreen instructions.

Setting the Clock

Step 1. Press **Clock**. The following screen displays:



Step 2. Press **Format** to change the date format to one of the following options: MM/DD/YYYY, DD/MM/YYYY, and YYYY/MM/DD.

Note

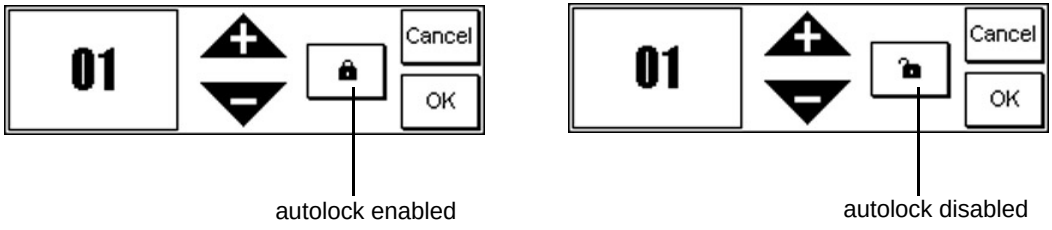
If a date format has previously been selected, that format displays in place of the format button. Press the indicated format to change the format. The options scroll each time the screen in pressed.

Step 3. Use the left and right arrows to move the cursor between the hours component, the minutes component, the seconds component as well as the month component, the day component, and the year component.

Step 4. Use the plus and minus arrows to increment or decrement the entries and press **OK**.

Setting the Communication Port Identification Number

Step 1. Press **Com Port**. One of the following screen displays:



Step 2. Use the plus and minus arrows to increment or decrement the entry.

Step 3. If a remote device will be used to operate the apparatus, ensure autolock is enabled.

Note

A remote command can activate the keypad lock only if the autolock is enabled. The touchscreen automatically unlocks at the test completion.

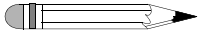
Once locked, no user input other than acknowledging an alarm is accepted.

Step 4. Press **OK**.

Filling the Water Bath

Step 1. Remove one vessel and set it aside. Pour ultrapure water through the hole in the vessel plate. Fill the water bath 3/4 full to allow for displacement by the vessels (refer to the sticker on the water bath for the appropriate fill level). You can also fill through the bottom drain valve if you have a pressurized ultrapure water hose.

Note

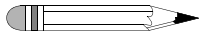


If possible, preheat the water to speed achievement of the desired water bath temperature. Use ultrapure water whenever possible to minimize scale and mineral buildup. Algaecides may be used to inhibit algae and bacteria growth. Check the label to ensure the formulation is compatible with the plastic materials used to construct the water bath. See "Water Bath Care" on page 41.

Step 2. Turn on the heater / circulator.

Step 3. Check all connections for leaks. Bubbles may appear at the water bath inlet as the air in the system is purged. After a few minutes flow into the water bath should be smooth and steady.

Note



Though the heater / circulator is designed to be self-priming, it might be necessary to help the priming process in a dry unit. To help clear the air, hold the unit below the level of the water bath for a minute or two with the left end up.

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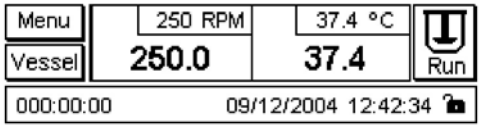
Chapter 4 Operating and Programming

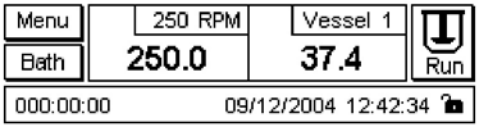
Warning

This is a rotating apparatus. Keep hair and loose clothing away from the spindles.

System Status

The system status displays on the main screen.





Following is a description of the main screen options:

Options	Function
Menu	Use this option to set the system parameters. Press **Menu**. The system menu screen displays. See "System Menu" on page 35.
Bath / Vessel	The Bath / Vessel button toggles between the options. Use this option to toggle between displaying the water bath temperature and the vessel temperature. When the button displays BATH, the vessel temperature displays on the screen. When the button displays VESSEL, the water bath temperature displays on the screen. Press the temperature display on the main screen to set the water bath temperature or print the vessel temperatures as applicable. To set the water bath temperature, press the water bath temperature display. Press the desired button (32, 37, or 37.4) to set the water bath temperature to the indicated value. Or use the up and down arrows to change the water bath temperature by 0.1 °C at a time. Press **OK** to save the temperature. Press **Cancel** to discard the value. To print the vessel temperatures, place the temperature probe in vessel 1, allow the temperature to stabilize, and press the vessel field. The current temperature for vessel 1 prints. Move the temperature probe to vessel 2, allow the temperature to stabilize, and press the vessel field again. The current temperature for vessel 2 prints. Continue moving the temperature probe, allowing the temperature to stabilize, and pressing the vessel field until the current temperatures for all the vessels print. ***Note: the vessel temperature is read individually with the optional vessel probe. This information is can be recorded using the optional printer. The reading is used to determine whether all the vessels are at the correct temperature prior to the start of a test.***
RPM	Press the speed display on the main screen to set the RPM. Press the desired button (50, 75, 100, or 250) to set the speed to the indicated value. Or use the up and down arrows to change the speed by 1 RPM at a time. Press **OK** to save the RPM. Press **Cancel** to discard the value.
Run / Stop	The Run / Stop button toggles between the options. Press **Run** to begin a test. If the test duration has been programmed, the test automatically stops when the elapsed time equals the test duration. Alternately, press **Stop** to stop the test. TEST PAUSED. PRESS STOP TO END THE TEST. PRESS RESUME TO CONTINUE THE TEST displays. Press **Resume** to continue the test, the test continues. Press **Stop**. The main screen displays.

Options	Function
Elapsed test time	The elapsed time and system date and time display at the bottom of the main screen. When an internal error occurs, the error information displays in this area. Press the display bar to acknowledge the error and silence the alarm.
System date and time	

System Menu

Following is a description of the system menu screen options:

Options	Function
Esc	Press **Esc** to return to the main screen.
Bath Temp	Press **Bath Temp** to set the water bath temperature. Use the plus and minus buttons to increment or decrement the entry. Press **OK** to save the water bath temperature. Press **Cancel** to discard the value.
RPM	Press **RPM** to set the RPM. Use the plus and minus buttons to increment or decrement the entry. Press **OK** to save the RPM. Press **Cancel** to discard the value.
Test Duration	Press **Test Duration** to set the length of time for which the test runs before automatically stopping. Use the right and left arrows to move the cursor among the components. Use the plus and minus to increment or decrement the entry. Press **OK** to save the test duration. Press **Cancel** to discard the value.

Options	Function
Printer	Press **Printer** to enable or disable the printer and control the automated print frequency. The Printer Settings screen displays. Press **Print Frequency** to enter the desired intervals at which the system status prints. Use the left and right arrows to move the cursor between the hours component and the minutes component. Use the plus and minus buttons to increment or decrement the entry. Press **OK** to save the print frequency. Press **Cancel** to discard the value. If the printer is disabled, Enable displays. Press **Enable** to enable the printer and Disable displays.
More...	Press **More** to access additional system settings. The secondary system menu screen displays. See "System Menu 2" below.

System Menu 2

Following is a description of the secondary system menu screen options:

Options	Function
Esc	Press **Esc** to return to the system menu screen.
Serial #	The serial number is factory-set. This option is available for use as applicable in servicing the apparatus.
Clock	Use this option to set the system date and time. See "Setting the Clock" on page 29.
Screen	Use this option to change the screen contrast, the screen brightness, and the touchscreen calibration. See "Setting the Screen Contrast and Brightness" on page 28.
Com Port	Use this option to enter the communication port identification number for the dissolution apparatus. See "Setting the Communication Port Identification Number" on page 30.

Chapter 5 Maintenance and Troubleshooting

Periodic Maintenance

Warning

The dissolution apparatus contains electrical circuits, devices, and components operating at dangerous voltages. Contact with these circuits, devices, and components can cause death, serious injury, or painful electric shock.

Periodic maintenance needs may vary depending on frequency of instrument usage.

Daily Maintenance

See “Paddle / Basket Shaft Care” on page 39, “Basket Care” on page 40, and “Water Bath Care” on page 41 as applicable for additional information on proper maintenance of your equipment.

- All parts exposed to the dissolution media should be cleaned after each use. Parts made from stainless steel, such as paddle and basket shafts, cannulas, and temperature probes, are particularly susceptible to surface corrosion if not cleaned

thoroughly after use. If any stainless steel parts show signs of surface discoloration, lightly wipe the surface with a soft cloth or nonabrasive pad to remove it.

- Carefully wipe the paddles or basket shafts after each use.
- Carefully wash the dissolution baskets after each use.
- Carefully wash the dissolution vessels after each use.

Caution

Use care when washing the TruCenter vessels as heat over 65 °C can damage the plastic of the magnetic ring flanges.

Weekly Maintenance

See "Paddle / Basket Shaft Care" on page 39, "Basket Care" on page 40, and "Water Bath Care" on page 41 as applicable for additional information on proper maintenance of your equipment.

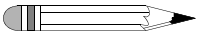
- Inspect the water bath and heater / circulator tubing for algae or other materials. If algae is present, change the bath water and add an algaecide. If you use a water bath algaecide or clear bath product, ensure it is compatible with PETG and acrylic.

Monthly Maintenance

See "Paddle / Basket Shaft Care" on page 39, "Basket Care" on page 40, and "Water Bath Care" on page 41 as applicable for additional information on proper maintenance of your equipment.

- Drain the water from the water bath and clean the bath thoroughly. Refill the water bath and add an algaecide.
- Clean and lubricate the upper and lower portion of the support legs with the recommended synthetic lubricant.

- It is recommended that the water bath temperature probe jack is checked for surface corrosion and wiped clean with a soft cloth or nonabrasive pad every one to three months.



Note

Depending on the frequency of use, it may be necessary to complete this maintenance procedure more often.

Paddle / Basket Shaft Care

1. When using with corrosive materials such as hydrochloric acid or media containing salts, be sure to rinse them thoroughly with deionized water immediately after each use, and dry thoroughly with a soft towel or cloth.

2. Do not clean with abrasive cleansers or cloths. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible, non-abrasive, and fully compatible with fluorocarbons and stainless steel before use. If in doubt, call the service department for advice before proceeding.

3. We recommend that you do not use a laboratory dishwasher. Clean paddles and basket shafts only by hand. The high temperatures to which your items would be subject in a dishwasher may damage the fluorocarbon coating.

4. Be sure to handle with care. Our QC laboratory has checked the shafts for straightness, to ensure that they will operate without significant wobble. If you must clean or handle them while they are still mounted on the instrument, use minimal pressure on the shaft to prevent them from bending. While in the chucks, just a little bit of pressure exerted on the shaft—especially near the blade or basket—can easily bend the shaft and cause significant wobble.

5. Use care when removing vessels from the apparatus while the paddles or basket shafts are installed so that you do not bump them.

6. When attaching or removing baskets, do not bend the clips excessively.

7. Please store paddles and basket shafts properly between uses. Do not simply place these items in a drawer. They will be subject to nicks, chips, and scratches as they

bump against each other. Place them back into the original styrofoam shipping container or other appropriate container between uses. This will prevent them from coming into contact with each other or anything else in the storage area.

Basket Care

1. When using with corrosive materials such as hydrochloric acid or media containing salts, be sure to rinse them thoroughly with deionized water immediately after each use, and dry thoroughly with a soft towel or cloth.

2. Please do not clean baskets or shafts with abrasive cleansers or cloths, especially if they're gold or Teflon coated. Mesh openings on baskets could enlarge, which could have an effect on results. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible, non-abrasive, and fully compatible with fluorocarbons and stainless steel before use. If in doubt, contact the service department for advice before proceeding.

3. We recommend that you do not use a laboratory dishwasher. Clean baskets only by hand. The high temperatures to which your baskets would be subject in a dishwasher may damage the fluorocarbon coating.

4. Use caution when handling baskets. It is important that they retain their cylindrical shape, so take care not to kink or bend the mesh. Check frequently to ensure that the mesh is completely open and that there are no rips or tears.

5. Please store baskets properly between uses. Do not simply place these baskets in a drawer. They will be subject to nicks, chips, and scratches as they bump against each other and they may get bent out of shape. Place them back into the original shipping container or other appropriate container between uses. This will prevent them from coming into contact with each other or anything else in the storage area.

Water Bath Care

Caution

Do not use cleaning compounds containing ammonia or abrasive cleaners on your water bath.

The water bath supplied with the Varian 705 DS Dissolution Apparatus should be maintenance free except for an occasional cleaning. If you use a water bath algaecide or clear bath product, ensure it is compatible with PETG and acrylic. The flow paths in the heater / circulator are primarily stainless steel and should tolerate most clear bath formulations. Check with the product manufacturer to be sure the product is safe for your water bath.

1. All of our water baths are fabricated entirely of commercial grade acrylic. When using them with corrosive materials such as hydrochloric acid or media containing salts, be sure to rinse them thoroughly with deionized water immediately after each use, and dry thoroughly with a soft towel or cloth.

2. Do not clean with abrasive cleansers or cloths. Use deionized water whenever possible. If you must use a cleanser or solvent, be sure that it is as mild as possible, non-abrasive, and fully compatible with PETG and acrylic before use. If in doubt, call the service department for advice before proceeding.

3. Do not use ammonia, window-cleaning sprays, kitchen scouring compounds, or solvents such as acetone, gasoline, benzene, alcohol, carbon tetrachloride, or lacquer thinner. These can scratch the material's surface and / or weaken it causing small surface cracks called "crazing".

4. Our recommendations include but are not limited to the following:

- Hot water:< 150 °F
- Vinegar (5% Glacial Acetic Acid)
- Ethyl alcohol: maximum 10%
- Isopropyl alcohol: maximum 25%

Repairing Leaking Fittings

Complete these steps if any of your water bath fittings are leaking:

Step 1. Turn off the heater / circulator and drain the water bath completely.

Step 2. Remove the leaky bulkhead fitting.

Step 3. Remove the elbow fitting from the bulkhead fitting.

Step 4. Inspect the bulkhead fitting gaskets for damage and replace them as necessary.

Step 5. Remove the old Teflon tape from all male fittings. Inspect the threads for damage and replace the fitting as necessary.

Step 6. Apply new Teflon tape to the male fitting threads.

Step 7. Reinstall and tighten the bulkhead fitting on the water bath.

Step 8. Reinstall and tighten the elbow fitting to the bulkhead fitting.

Step 9. Fill the water bath and turn on the heater / circulator.

Step 10. Inspect the fitting for leaks. If the fitting still leaks, contact the Dissolution Systems Service Department.

Visual Checks

Caution

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified, or Varian-authorized service engineers.

Step 1. Raise the drive unit to approximately full height.

Step 2. Turn off power to the instrument and remove the power cord.

Step 3. The top cover is attached with seven screws on the top and six screws on the bottom of the drive unit.

Step 4. Remove the Phillips head screws.

Step 5. Lift the top cover and secure it to the underside of the top plate with clamps.

Step 6. Inspect the drive belt for unusual wear, fraying and tension.

Step 7. Remove the clamps securing the top cover to the underside of the top plate.

Step 8. Replace the top cover.

Step 9. Replace the Phillips head screws.

Step 10. Reconnect the power cord and turn on the instrument.

Report Center Impact Printer

The following is helpful information for using your impact printer.

Installing the Cartridge Ribbon

If the printer is used infrequently, the print impression sometimes becomes weak because the ribbon dries out. If the printed material is difficult to read and you suspect this is the cause of the problem, advance to a new section of the ribbon by pressing the printer toggle switch to the *Paper feed* position. If the printing is still faint, replace the cartridge.

To install the cartridge:

Step 1. Toggle the printer off line by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.

Step 2. Four small grooves are embossed on the printer cover. Gently push on these grooves to tilt the cover. When the printer cover is tilted up, you can lift it off completely.

Step 3. Push down on the right side of the ribbon cartridge (marked PUSH) and remove the old cartridge.

Step 4. Install the new cartridge. If there is already paper in the printer, hold the cartridge between your thumb and index finger, slide it over the paper and into the printer compartment. Ensure the paper is between the ribbon cartridge and the ink ribbon. Ensure the ink cartridge is inserted firmly to prevent weak or irregular printing. The cartridge must be properly seated and aligned for the best printing.

Step 5. Turn the cartridge knob (marked by an arrow) clockwise to stretch the ribbon taut.

Step 6. Replace the cover.

Step 7. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates.

Step 8. Replace the paper if necessary.

If you get ribbon ink on the printer's plastic cover, remove it immediately. Once dried, it is difficult to remove.

Replacing the Paper Roll

Step 1. Toggle the printer off line by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.

Step 2. Grasp the paper roll cover firmly by the grooves on the side and the front edge. Pull outward to remove the cover.

Step 3. Press the printer toggle switch to *Paper feed* to advance the paper approximately one inch beyond the paper cutter.

Step 4. Using scissors, cut the paper feeding to the printer and remove the paper roll.

Step 5. Pull the remaining paper through the printer mechanism. *Pull the paper from the front (paper cutter side)*. Pulling the paper out of the back of the printer will damage the print mechanism.

Step 6. Unroll several inches of paper on the new roll.

Step 7. If it is jagged, cut a straight edge on the paper roll to facilitate the entry of the paper into the printer.

Step 8. Slide the paper through the slot connecting the paper compartment and the printer compartment. You can slide it in approximately 1/4 inch before it stops.

Step 9. While holding the paper in place, press the printer toggle switch to the *Paper feed* position and hold until approximately one inch of paper has emerged from the top of the printer. Make sure the roll of paper feeds squarely. If it does not, the paper will jam and possibly damage the printer mechanism.

Step 10. Release the printer toggle switch.

Step 11. Turn the paper roll to take up any slack in the paper feeding to the printer.

Step 12. Place the paper roll into the paper compartment.

Step 13. Replace the paper roll cover. If the cover is difficult to remove or replace, the left and right edges can be trimmed or shaved with a utility knife allowing the cover to slide easier.

Step 14. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. The Ready LED illuminates.

Toggling Your Printer Online

Complete these steps to toggle your printer online:

Step 1. Toggle the printer online by pressing the printer toggle switch to the *OnLine / Off Line* position. When the printer is off line, the Ready LED does not illuminate.

Step 2. Release the switch and it returns to the center position. The Ready LED illuminates and a READY message prints if the PRINT READY command has not been turned off. See "Printer Configuration" on page 47 for instructions on turning on and off the PRINT READY command. When you first turn on the instrument, it prints a READY message to assure you that the built-in microprocessor is operating properly.

When you turn off the printer, wait at least three seconds before turning it on again.

Printer Self Test

You can test the print head and ribbon only *after* inserting paper. Do not attempt to print without paper. Follow these steps to perform a printer self test:

Step 1. Turn off the dissolution apparatus.

Step 2. Press and hold the printer toggle switch in the *Paper feed* position.

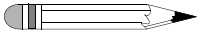
Step 3. Turn on the dissolution apparatus.

Step 4. Hold the printer toggle switch until printing begins. The printer prints a list of the current configuration settings and performs a continuous print test.

Step 5. Press the printer toggle switch to the *OnLine / Off Line* position to stop the printing operation.

Step 6. The printer is ready to resume normal operation.

Printer Configuration



Note

The printer configuration is set by the factory. This procedure should be performed only if the printer displays erroneous characters. Contact the Dissolution Systems Service Department for assistance, if necessary.

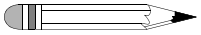
Step 1. Turn off the dissolution apparatus.

Step 2. Press and hold the printer toggle switch in the *OnLine / Off Line* position while turning on the instrument.

Step 3. Hold the printer toggle switch in the *OnLine / Off Line* position for six seconds after the instrument is turned on, then release the switch.

Step 4. The printer should print: *** SETUP MENU *** and CONFIGURE... [NEXT/OK]. If this message does not print, repeat steps 1 through 3.

Step 5. The printer toggle switch is used to complete the configuration. Pressing the left side of the printer toggle switch selects NEXT to advance to the next menu item. Pressing the right side of the printer toggle switch selects OK to accept what is stated on this line of the menu item. Each time the switch is pressed, another part of the menu prints. Allow the printer to finish printing before pressing the switch again. See the table of commands below.



Note

The printout is easier to read if the printer cover is removed.

*** SETUP MENU***		
CONFIGURE	[NEXT/OK]	Press NEXT to avoid configuration
CUSTOM	[NEXT/OK]	Press OK to enter custom mode
CUSTOM MENU		
PRINT CUSTOM SETUP	[NEXT/OK]	Press NEXT
AUTO SEQ = NO	[NEXT/OK]	Press OK
ZERO = Ø	[NEXT/OK]	Press OK
POUND SIGN = #	[NEXT/OK]	Press OK
_(UNDERSCORE)	[NEXT/OK]	Press OK
ONLINE/OFFLINE = YES	[NEXT/OK]	Press OK
EXT CH SET = NO	[NEXT/OK]	Press OK
PRINT READY = YES	[NEXT/OK]	Press NEXT
PRINT READY = NO	[NEXT/OK]	Press OK
READY...		

Your printer is now configured correctly.

Water Bath Temperature Probe Accuracy Test

The temperature probe can be tested using a high quality voltmeter capable of at least four digit resolution and a water bath of known temperature. Both the multi-meter and the bath temperature probe or calibrated thermometer must be traceable to a known reference standard such as NIST.

Step 1. Place the probe into a known temperature water bath and allow several minutes for the probe to equilibrate.

Step 2. The resistance is measured by attaching the leads of the multi-meter to the top and shank of the 1/4-inch phone plug.

Step 3. Refer to the following table to find the resistance value of the probe at the known bath temperature. Temperatures between the values listed may be interpolated.

Step 4. Probes are interchangeable and manufactured with a tolerance of ± 0.2 °C. Probes found to be outside the tolerance of ± 0.2 °C should be replaced.

Temp. °C	Resistance Ohms	Temp. °C	Resistance Ohms	Temp. °C	Resistance Ohms
-5.0	9530	24.0	2354	53.0	724.50
-4.0	9046	25.0	2252	54.0	697.90
-3.0	8586	26.0	2156	55.0	672.50
-2.0	8151	27.0	2064	56.0	648.10
-1.0	7741	28.0	1977	57.0	624.80
0.0	7355	29.0	1894	58.0	602.40
1.0	6989	30.0	1815	59.0	580.90
2.0	6644	31.0	1739	60.0	560.30
3.0	6319	32.0	1667	61.0	540.50
4.0	6011	33.0	1599	62.0	521.50
5.0	5719	34.0	1533	63.0	503.30
6.0	5444	35.0	1471	64.0	485.80
7.0	5183	36.0	1412	65.0	469.00
8.0	4937	37.0	1355	66.0	452.90
9.0	4703	38.0	1301	67.0	437.40
10.0	4482	39.0	1249	68.0	422.50
11.0	4273	40.0	1200	69.0	408.20
12.0	4074	41.0	1152	70.0	394.50
13.0	3886	42.0	1107	71.0	381.20
14.0	3708	43.0	1064	72.0	368.50
15.0	3539	44.0	1023	73.0	356.20
16.0	3378	45.0	983.80	74.0	344.50
17.0	3226	46.0	946.20	75.0	333.10
18.0	3081	47.0	910.20	76.0	322.30
19.0	2944	48.0	875.80	77.0	311.80
20.0	2814	49.0	842.80	78.0	301.70
21.0	2690	50.0	811.30	79.0	292.00
22.0	2572	51.0	781.10	80.0	282.70
23.0	2460	52.0	752.20		

Fuse Replacement

Warning

The dissolution apparatus contains electrical circuits, devices and components operating at dangerous voltages. Contact with these circuits, devices and components can cause death, serious injury, or painful electric shock.

Panels or covers that are retained by fasteners which require the use of a tool for removal may be opened only by Varian-trained, Varian-qualified or Varian-authorized service engineers.

The fuse holder is located in the lower section of the power entry module on the rear of the dissolution apparatus.

Step 1. Before checking or attempting to replace a fuse, turn the instrument off and remove the power cord from the dissolution apparatus.

Step 2. There are two release slots; one on the left and one on the right. The fuse holder is released by inserting a small screwdriver into one of the slots. However, two screwdrivers, one in each slot, may work best.

Step 3. A slight application of pressure toward the center of the compartment releases the fuse holder.

Step 4. Pull the fuse holder out of the power entry module. The fuse is located in the removable holder. The fuse for the 230 V apparatus is a 2 amp metric (5 mm x 20 mm) fuse and for the 115 V apparatus is a 3 amp metric (5 mm x 20 mm) fuse.

Step 5. Place the new fuse into the holder and insert the fuse holder into the power entry module. The holder is keyed and can be inserted only one way.

Step 6. Push the fuse holder into the power entry module until both sides snap. Replace the power cord.

Troubleshooting

The Dissolution Systems Service Department can assist you if you experience problems or have questions concerning your dissolution apparatus. Many problems can be traced to simple sources and are easily solved.

Following is a troubleshooting guide which may help you. The Dissolution Systems Service Department can be reached at 800.229.1108 (inside the US) or 919.677.1108 (outside the US). Optionally, you can send a fax to 919.677.1138. You can also e-mail the Dissolution Systems Service Department at dissolution.service@varianinc.com.

Problem	Possible Cause	Suggested Solution
The unit does not respond when main power is ON.	There is a blown fuse in the rear panel AC line cord receptacle.	Replace if necessary. See "Fuse Replacement" on page 51.
	The unit is not plugged into a power outlet.	Plug the unit into an appropriate power outlet.
	The electrical outlet does not have power.	Check the outlet for electrical current.
The spindles are not synchronized.	The drive belt is loose.	Tighten the drive belt.
The printer does not print.	The printer is offline.	Ensure the printer is online and enabled.
	The printer frequency is set to 0.	Set the correct printer frequency.
	The printer is out of paper.	Ensure paper is installed in the printer.
The water bath will not heat.	The heater / circulator is not powered on.	Ensure the heater / circulator is powered on.
	The temperature probe is not in the water bath.	Place the temperature probe in the water bath.
	The water bath temperature is set incorrectly.	Set the correct water bath temperature.

Problem	Possible Cause	Suggested Solution
The keypad does not respond to user input.	The apparatus is in autolock mode. The padlock displays locked on the screen.	The 705 DS screen is locked until the VK 8000 sends the command to stop the paddles. If the screen does not unlock at that point, turn off the 705 DS and turn it back on. ***Note: if the VK 8000 is interrupted before the end of a test, the stop command may never be sent.***
The spindles do not turn.	Spin disable is active.	Enable spin enable.
	The drive unit is raised.	Lower the drive unit to the proper operating position.
The vessel temperatures do not display.	The probe is reading the water bath temperature instead of the vessel temperature.	Press the temperature display to display the vessel temperature.

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Chapter 6 Service and Warranty

The warranty is provided by Varian, Inc. or one of its authorized representatives.

Service and Warranty Information

Varian dissolution products carry a one-year warranty on parts and labor. The Dissolution Systems Service Department (or one of its representatives) will, at its option, either repair or replace any mechanical and electrical components in your instrument which prove to be defective. During the first year of warranty coverage, there is no charge for the labor to repair your unit. The Dissolution Systems Service Department (or one of its representatives) will determine the best site to repair the unit, either onsite or returned to Varian, Inc. Any onsite warranty services are provided only at the initial installation point. Installation and onsite warranty services are available only in Dissolution Systems service travel areas.

Exclusions and Limitations

Excluded from this warranty are expendable or consumable items such as, but not limited to, paddles, baskets, vessels and acrylic water baths. Also excluded are defects from improper or inadequate maintenance by the customer, user-induced chemical action or contamination, unauthorized modification or misuse, and improper site preparation and maintenance.

Operation of software is not warranted to be uninterrupted or error-free.

Obtaining Warranty Service

To obtain warranty service in the United States, contact the Dissolution Systems Service Department at 800.229.1108 to obtain authorization to return units for repair. At the option of the customer, onsite warranty service is available, but travel charges may be incurred. The customer should prepay all shipping charges for products returned to the Dissolution Systems Service Department (unless otherwise authorized), and Varian, Inc. will pay all charges for return to the customer.

Warranty Limitations

Varian, Inc. makes no other warranty, either express or implied, with respect to this product. Specifically disclaimed are any implied warranties of merchantability and fitness for a particular use. In no event will Varian, Inc. be liable for any indirect, incidental, or consequential damages arising from the use of this product. This warranty gives you specific legal rights which may vary from state to state or province to province, so you may have other rights and some of these exclusions may not apply to you.

Exclusive Remedies

The remedies provided herein are the customer's sole and exclusive remedies. In no event shall Varian, Inc. or its representatives be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory. Some states or provinces do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

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